

# Long Island Botanical Society

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Winter 2015

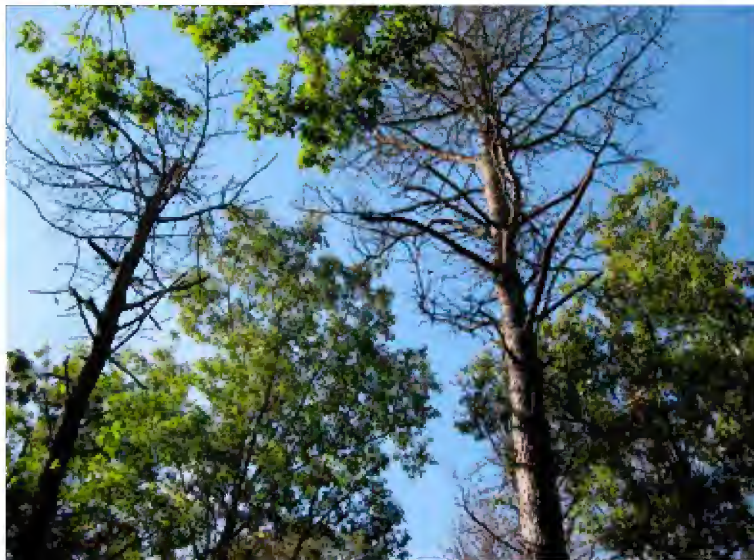
## The Southern Pine Beetle on Long Island

by MaryLaura Lamont, Education Committee Chair, Long Island Botanical Society

For at least the last three years, possibly four, I had noticed that the pitch pines (*Pinus rigida*) growing at the 613-acre National Park Service's William Floyd Estate in Mastic Beach, Long Island, had been dying, and dying very fast. When a tree looked "unhealthy" it did not last long--it was dead by the end of the growing season. Unhealthy to me meant seeing incredible numbers of needles on the ground underneath the tree in the summer months, as well as clumps of dying yellowish-brown needles on the tree, and an overall rather "sparse," droopy look.

I had chalked it up to the fact that most of them were fairly old (average 50-70 years) and perhaps it was their time to die, but it seemed too many were dying too fast. It was alarming enough that I wondered what would happen to our small but important breeding population of pine warblers (*Dendroica pinus*).

At the annual Pine Barrens Research Forum in October 2014 at Brookhaven National Lab there was an excellent lecture given by Dartmouth University Ph.D. candidate Carissa Aoki, on the possible advance of the southern pine beetle (*Dendroctonus frontalis*) into our area. She suggested that we should look for it as it was confirmed in the New Jersey pine barrens since 2001, causing much destruction. This prompted me to think that we had southern pine beetle at the Estate and that's why so many pitch pines were dying so fast. After the lecture I talked to Carissa and she agreed that it sounded like an infestation and offered a trap. Within a day or so of my baiting



Dead and dying pitch pines at the William Floyd Estate, Mastic Beach, Long Island. October 9, 2014. [Photo by MaryLaura Lamont]

the trap for these destructive pests I had collected literally hundreds of them. They were sent up to Dartmouth and were identified and confirmed as the southern pine beetle. Southern pine beetles are being confirmed in many locations all over the south shore of Long Island, not just at the Estate. They have been identified at Wertheim National Wildlife Refuge, Connetquot State Park, and Henry's Hollow Pine Barrens State Forest, to name just a few places. As people continue to look

for them I'm certain more infestations will be found. Now that it has been confirmed that the beetles are here killing pines, there has been TV coverage as well as numerous newspaper articles. It now seems obvious that the small insects have been on Long Island for several years. The Research Forum talk was the impetus to look for them and it caught most folks, including myself, off guard.

This is the first time this pest has been identified in New York State in State and Fish and Wildlife properties, as well as in National Park Service lands (William Floyd Estate). Pending further investigations by forestry experts, plans will have to be implemented to stop the advance. Although not a major component of the forests at the William Floyd Estate, there are many beautiful pines in pockets throughout the property, and scattered individuals as well. Many of the remaining trees are already infected with the beetles, so it is only a matter of time before all pitch pines are dead within this site. It may be too late. What a loss for the area and all the animals that

(Continued on page 6)

## Long Island Botanical Society

Founded: 1986 • Incorporated: 1989

The Long Island Botanical Society is dedicated to the promotion of field botany and a greater understanding of the plants that grow wild on Long Island, New York.

Visit the Society's Web site  
**[www.libotanical.org](http://www.libotanical.org)**

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## Society News

**LIBS thanks Mike Feder** for his 4 years of service as chair of the Field Trip Committee. During his tenure, Mike organized a robust field trip schedule each year, thus keeping strong the Society's commitment to field work throughout Long Island and adjacent areas. Thanks so much, Mike.

**Members' Night.** At LIBS' December 9 meeting, **Larry Liddle** shared his experiences in seaweed culture on the isle of Lembongan, Bali, Indonesia; **Lois Lindberg** presented highlights from her talks on plant legends and folklore; **Margaret Conover** reprised her TEDx talk on "A Cure for Plant Blindness" (see <http://tinyurl.com/k2pynr4>); and **Andy Greller** shared his experiences on a natural history trip to Estonia. The meeting was dedicated to **Zu Proly** (see pg. 3).

**2015 Long Island Natural History Conference** will take place March 20-21 at Brookhaven National Laboratory in Upton. This conference provides an important forum for cutting-edge research and reports on Long Island's biodiversity. For more information, see <http://longislandnature.org/>

**New England Botanical Club invites LIBS** to a free June 2015 conference celebrating its 120th anniversary. More information at <http://www.rhodora.org/conference2015/>



### LIBS 30-Year Anniversary Field Trip

Every five years LIBS celebrates its anniversary by visiting a botanically interesting region. Past trips include Costa Rica, The Great Smoky Mountains, Newfoundland, and Florida. For 2016, LIBS is planning a trip to **The Sierra Nevada and White Mountains, California**. Dr. Bob Gibbons will be our leader and the trip is being planned for July 11-21, 2016.

Bob Gibbons has been described as "one of Britain's best naturalists" and has led hundreds of botanical and natural history trips all over the world including the Sierras and Cascades of the West Coast. Bob presented a program to LIBS in 2011 on "The Most Flowery Places in the World," based on one of his more than 40 books. Bob Stewart (author of "Common Butterflies of California," an excellent birder, and very familiar with the flora of the Sierras) will be co-leader.

If you are interested in attending this special event please email LIBS president Eric Lamont ([elamont@optonline.net](mailto:elamont@optonline.net)). More information will be included in newsletters and the Society's website. Deposits will be required in the summer of 2015. Hope to see you in the Sierras.

*Join LIBS today!*  
*Annual Membership is \$20 payable to:*  
**Long Island Botanical Society**

*Mail your dues to:*  
*Carol Johnston, LIBS Treasurer*  
*347 Duck Pond Road*  
*Locust Valley, NY 11560*

**NOTE:**  
**Membership renewals are due in January**



## Zu Proly Honored by LIBS

It happened so fast. Just like Zu. Fast. One minute she was at a LIBS meeting (she rarely missed one) serving others and being hospitable, and then . . . she's off to Boca Raton Florida to live closer to family members. We tried to plan a going away dinner, but it was too late. So, in honor of Zu, we dedicated the December 2014 LIBS Members' Night meeting to her, for her inexhaustible service to LIBS and others.

Zu became a LIBS member in 1993 and a Life member in 2001. Since 2002, Zu has served as a member of the LIBS Hospitality Committee. Here are some of the memories of Zu that were shared at the Members' Night meeting:

*We first met Zu at Muttontown Preserve waaay back in the '70s when she led school groups there for Bill Paterson and Ruth Neumann. She also did butterfly counts, led various expeditions and was frequently bleeding from scratches on her bare legs. --Lois Lindberg*

*Among LIBS members, I have known Zu longer than anybody because Zu was my gym teacher in school! --Dot Titus*

*Zu's big smile and handshake absolutely envelop you - she is truly one of the warmest and most genuine people I know! I will never forget her description of how she has no screens on her windows in Glen Cove; the better to share her home with any butterfly, bug or other creature who wanders by. Now that's a true love of nature! --Carol Johnston*

*A few years ago, I was leading a field trip for LIBS to the William Cullen Bryant Preserve and we were at the bottom of the ravine. I had the impulse to go straight up the slope to return to the Museum building. Zu was right behind me all the way up to the very top! One participant, much younger, remarked that she was exhausted and would never, ever follow me on a field trip again! Zu was just smiling and perhaps looking for another hill to climb while she was "in gear," I guess. I remember her as always smiling, cheerful and full of memories of travels and experiences that I would never*



Relaxing on the Newfoundland trip, 2006. [Photo by B. Conolly.]

*have the nerve to try. What a lady! --Andy Greller*

*A few years ago several of us were having dinner at the IHOP, or some other reincarnation of it, on Northern Blvd. prior to the LIBS meeting. A VERY OLD woman, who nobody knew, walked over to our table, looked at Zu, and said, "Aren't you Zu Proly?" Zu did her little heh, heh, heh laugh (you know what I mean), and said that she was. To which the VERY OLD woman replied,*

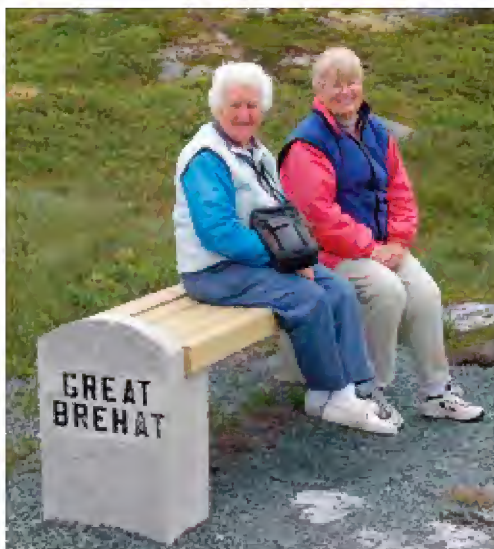
*"You were my high school gym teacher." I guess Zu never changed. --Rich Kelly*

*On my last visit to see Zu in her Glen Cove apartment, a locust flew in and landed on her shoulder. It eventually began to walk slowly up to her face and when it got near her eye, I put out a finger, took it off and carried it down so we both could study it very carefully. When I left, the locust was back on Zu's shoulder. Zu was so special. We shouldn't forget all the food she organized for the meetings at Muttontown! She should be thanked for being LIBS hospitality chairman for quite a long time. --Barbara Conolly*

*My unforgettable memory of Zu is from Newfoundland in 2006, during the LIBS 20-year anniversary trip. On the 5<sup>th</sup> day of the trip I found myself hiking with Zu on a trail over coastal bogs and low limestone ridges. Our destination was a dock on Western Brook Pond for a boat ride up a spectacular land-locked fjord. Along the trail we took a rest and then got ready*

*to head out. Zu was struggling with her backpack and I gave her a hand. Well, one hand wasn't enough to lift the backpack. The thing must have weighed 100 pounds. I literally asked if she had rocks in it. I offered to carry it and Zu was delighted. I couldn't believe she had been lugging the darn thing around rocky shorelines and up and down mountains for several days. She is one strong woman, in addition to all her other wonderful attributes. --Eric Lamont*

[Ed. Note: Those who wish to contact Zu may obtain her new mailing address from B. Conolly or M. Conover.]



With Dot Titus in Newfoundland, 2006. [Photo by B. Conolly.]

# A White Ash-Tulip Poplar Forest Stand in Queens County, Long Island, with Notes on the Soil Composition

Eric C. Morgan – Department of Biology, Farmingdale State College

Andrew M. Greller – Department of Biology, Queens College

## Abstract

A forest stand within Queens County, Long Island in which *Fraxinus americana* is a co-dominant is described here. The stand is discussed in relation to its associated species and the soil characteristics of the site. A threat from a recently invasive bacteria-caused disease called ash yellows has further prompted this study.

## Introduction

White ash, *Fraxinus americana*, is present in several forest associations on Long Island, as several past studies have reported. Conard (1935) describes *F. americana* as associated with *Liriodendron* on moist slopes, while also recognizing a *Fraxinus-Juglans* (ash-hickory) association, although he acknowledges that the latter relationship has not been studied. Greller (2001) also recognizes the species as a component of the tulip tree series, within his class “non-oak hardwoods dominant,” which grows on upland well-drained sites on the island. *Fraxinus americana* is also dominant in the mixed hardwood swamp stands of Lake Success as described by Greller (2000), and within Queens County, Greller (pers. obs.) has found other populations of ash within upper Alley Creek ravine and on the grounds of Fresh Meadows golf course.

Other than these, documentation of associations in which *Fraxinus* is a dominant is nearly non-existent in the extensive floristic literature for Long Island. The purpose of this article is to document a forest stand in Alley Pond Park, Queens County, New York City in which mature *Fraxinus americana* and *Liriodendron tulipifera* trees appear to be co-dominants, and to examine associated soil characteristics.

## Site Description and Methods

Alley Pond Park is located in northeastern Queens County, and is owned and operated by the City of New York, Department of

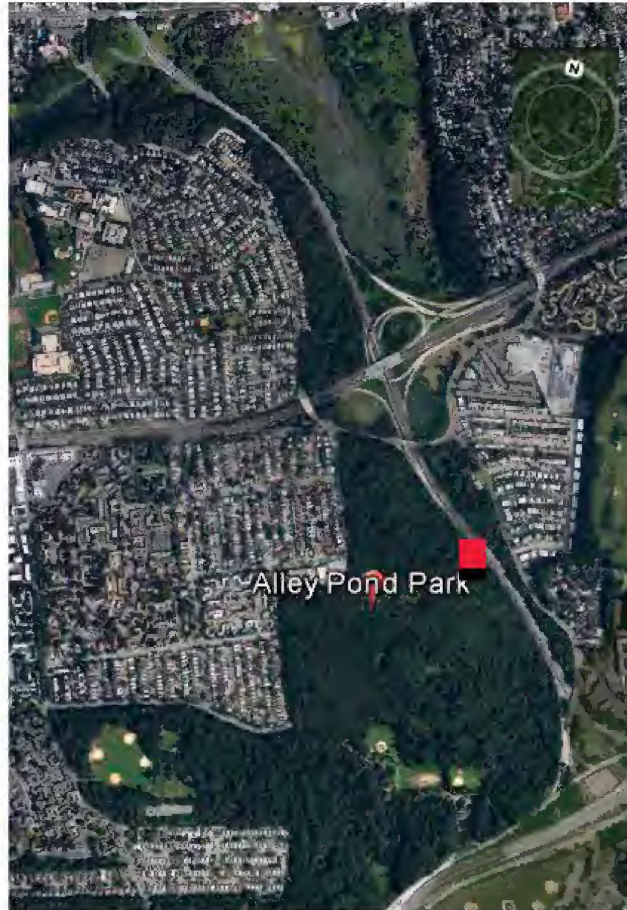


Figure 1. Alley Pond Park. The red square indicates the approximate location of the study site. [Photo from Google Maps: 7/1/2014]

Parks and Recreation (Figure 1). The 250-hectare site has a knob-and-kettle topography with an elevation range between 140 and 300 feet above sea level. Over the past few decades, several studies have documented its forest composition (Greller and Garcia 1986; Stalter 1981) and the vascular flora of the local area (Greller 1977). Separating the park into five sections, Greller and Garcia (1986) recognized *Fraxinus americana* within a section adjacent to the site of this current study, where it had an importance value lower than that of *Liriodendron tulipifera* (tulip poplar), *Acer platanoides* (Norway maple), *Betula lenta* (sweet birch), *Liquidambar styraciflua* (sweet gum) and *Quercus rubra* (red oak).

The present stand (Figure 2) is located on a north-northeastern facing slope, overlooking the Cross Island Parkway that divides the park. At the top of the slope, approximately 100 meters SSW, is Decodon Pond,

the largest of the kettle ponds within the park, and one that remains moist throughout the summer months (Figure 3). To examine the study site, all trees greater than 2cm diameter at breast height (dbh) both alive and dead, were measured and tallied in order to determine importance value (IV)\*.

To analyze the soil characteristics, soil samples were taken at fifteen randomly selected sites throughout the area being analyzed. An additional fifteen random samples were taken in the adjacent forest area where *F. americana* was not present. All sample sites were separated by at least 10m. At each site,

\***Importance Value (IV)** is one measure of the relative dominance of species in a forest community. This is calculated as the average of **Relative Dominance**: Basal area of a given species as a percentage of the basal areas of all of the species, and **Relative Density**: Number of individuals of one species as a percentage of the total number of individuals of all species.



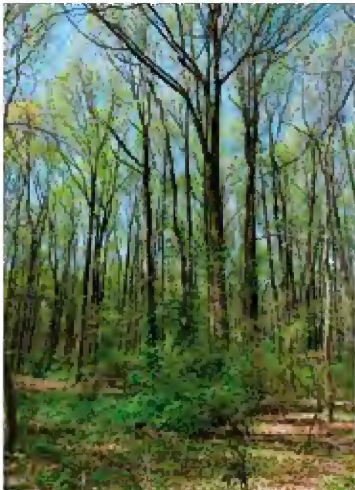


Figure 2. Study site looking west, uphill. [Photo by A. Greller: 4/17/2012]

debris and leaf litter were removed and a measured sample was taken using a slide hammer and removable cylinder for the calculation of bulk density. An additional sample was then taken at each site and bagged separately for the determination of pH and detailed soil composition through soil hydrometer analysis.

One hundred and eleven trees (16 species) were measured. Of these, 48 percent of the *F. americana* appeared to be dead, and all living specimens were in various stages of decline. No dead trees of any other species were found in the sampling site. The importance values (IV) for all trees at the site (Table 1) show *Fraxinus americana* to be the most important species with an IV of 25.84, a value very close to that of *Liriodendron tulipifera* with an IV of 24.67. The third most important species is *Betula lenta*, with an IV of 7.03, making *F. americana* and *L. tulipifera* co-dominants in the stand. Only two oak species, *Quercus rubra* and *Q. velutina* (black oak) were present, while the other components include hydrophilic species such as *Acer rubrum* (red maple), *Betula lenta*, *Platanus occidentalis* (American sycamore), *Liquidambar styraciflua* and *Carpinus caroliniana* (American hornbeam), suggesting that a mixed hardwood swamp forest is present within the site.



Figure 3. Study site outlined in red, Decodon Pond on the left. [Photo from Google Maps: 12/31/2003]

The soil samples collected from the *Fraxinus* site and adjacent non-*Fraxinus* site were relatively similar. Average soil pH did not differ significantly between the *Fraxinus* area (4.85) and the adjacent area (4.76). The soil hydrometer also revealed no statistically significant differences between sites. Both areas fell within the sandy clay loam series as designated by the USDA (2014). These results show that neither pH nor soil texture is likely to have played a role in the distribution of *Fraxinus* at the

site. The tests of soil bulk density however, yielded a statistically significant difference: the soils within the *Fraxinus* sample site measured an average of 1.051 g/cm<sup>3</sup> and the adjacent non-*Fraxinus* site measured 0.808 g/cm<sup>3</sup>. While both sites fall within the ranges of bulk density described as ideal for plant growth (USDA 2014) the significantly higher bulk density throughout the *Fraxinus* stand may have been a necessary factor in the trees' original establishment. *Fraxinus americana* is often cited as well adapted to moist, but well-drained soils (Hightshoe 1988) and the slightly more compacted soil may have provided the retention of moisture needed for the species.

In recent years, *Fraxinus americana* has been affected throughout our area by the phytoplasma Candidatus *Phytoplasma fraxini* (ash yellows) which acts upon the phloem of a number of ash species. Taxonomically, this pathogen is likely to undergo future revisions to its nomenclature as more is learned about its biology. The prefix "Candidatus" refers to the inability to grow this organism in culture.

To assign definitive causal status of this disease as the reason for a tree's decline requires molecular diagnostic testing such as an ELISA test, however for our purposes, the symptoms of the disease can accurately substitute for these costly tests. With a high degree of certainty and with no other causal agents being evident, ash yellows is the likely culprit in the *Fraxinus* trees' decline. Throughout Alley Pond Park and our region, many ash trees show leaf drop, loss of apical dominance on branches,

Table 1.			
Importance values (IV) for all tree species with a dbh of at least 2cm.			
Species	Relative dominance	Relative density	IV
<i>Fraxinus americana</i>	30.957	20.721	25.84
<i>Liriodendron tulipifera</i>	27.717	21.622	24.67
<i>Betula lenta</i>	5.951	8.108	7.03
<i>Prunus serotina</i>	5.492	8.108	6.80
<i>Acer rubrum</i>	5.060	7.207	6.13
<i>Quercus rubra</i>	6.531	5.405	5.97
<i>Fagus grandifolia</i>	3.907	6.306	5.11
<i>Carya glabra</i>	2.052	8.108	5.08
<i>Liquidambar styraciflua</i>	3.081	2.703	2.89
<i>Quercus velutina</i>	2.683	1.802	2.24
<i>Platanus occidentalis</i>	2.569	1.802	2.19
<i>Acer platanoides</i>	1.093	2.703	1.90
<i>Sassafras albidum</i>	1.839	1.802	1.82
<i>Prunus subhirtella</i>	0.645	1.802	1.22
<i>Carpinus caroliniana</i>	0.290	0.901	0.60
<i>Hamamelis virginiana</i>	0.133	0.901	0.52

(Continued on page 6)

(White Ash-Tulip Poplar Forest continued from page 5)

extensive “witches brooms” throughout their canopy, and ultimately, the death of the tree—all symptoms of ash yellows.

### Conclusion

The paucity of oak (*Quercus*) species in the Alley Pond Park stand that we examined, the position of the stand downhill from Decodon Pond, and the dominance of hydrophilic tree species, suggest that this stand constitutes a type of mixed hardwood swamp forest. Extensive death of the mature trees in our stand of *Fraxinus americana* suggests that ash yellows may be responsible. This disease is likely to spread further in the coming years so that ash species may very well be facing an uncertain future throughout the region, making published documentation of *Fraxinus* stands such as this even more important.

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(Southern Pine Beetle continued from page 1)

live among the pines. Down on the barrier beach of Fire Island, just across the Bay from the William Floyd Estate, are rare pitch pine dune lands (S-1). I have suggested to Resource Management staff of Fire Island National Seashore that those areas be monitored for the pine beetles. I would suspect the beetles will be found there too.

This destructive beetle is black in color and only 2-4mm in size, and it's amazing that so small a creature can overpower a living tree. They actually overwhelm it with their sheer numbers. They lay their eggs in the cambium layer of the tree and feed on phloem tissues, which transport nutrients for the tree. They eventually girdle the tree and kill it. The beetles carry the blue-stain fungus (*Grosmannia clavigera*) which also helps kill the tree. This fungus lives in the xylem tissue and thereby blocks the tree's water flow. Usually, but not always, the beetles attack unhealthy, stressed trees. Long Island has had two devastating hurricanes in the last three years, Irene and Sandy, and the pitch pines at the Estate have taken direct hits of massive amounts of salt spray and incredible winds, and some pine trees near Moriches Bay had their roots inundated with sea water for a time. The last two summers have been extremely dry, with hardly any rain. These trees have been recently stressed and I believe that is one of the major reasons why so many of the pitch pines are succumbing to this new pest. With this foothold, the southern pine beetle may start killing even healthy trees. Much of the scientific literature states the beetles are attracted to weakened mature trees, and that's exactly what is happening at the William Floyd Estate.

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### Pitch Pine

(Robert Francis: Collected Poems 1936-1976)

The pitch pine is a plain-man tree  
Rough with masculinity  
Any seeing man can see.

Its needles are no tree-girl's dress.  
It scorns all pretty-prettiness.  
Better the ornament the less.

The land it loves is any land  
With plenty of stone, plenty of sand.  
For dainties it makes no demand.

Small tufts of needles here and there  
Bristle from the bark like hair  
On a man's knuckle, in his ear.

*(Southern Pine Beetle continued from page 6)*

In New Jersey, forestry experts are trying to stop its advance by cutting down hundreds of surrounding acres of healthy pine trees. Whether that will be done here in Long Island's pine barrens is yet to be decided and many forestry experts and managers in New York State are now trying to find out how widespread the infestations are. Many questions need to be answered. How far north will the southern pine beetle range in the future? We experienced a very cold snowy winter in 2013-4 but these "southern" insects survived. Can they be controlled and stopped here on Long Island? How did they arrive and when?

The unique pine barrens ecosystem on Long Island is well known, well studied and beloved by many people. In this time of climate change the changes are happening almost too fast. The southern pine beetle invasion on Long Island is a case in point. Let us hope that it can be controlled so that this unique and beautiful ecosystem does not disappear forever. The lecture at the Brookhaven Lab on the beetles was an eye opener

for me, but at least I found an answer to why so many pines were dying so fast. So many natural systems and habitats that we know and care about are under assault, and can be changed forever through new climate "alterations." I can't imagine a Long Island without pitch pines. I suppose neither could people, of not too long ago, imagine a Long Island (or the United States) without their majestic chestnut trees!

*[Ed. Note: MaryLaura recently reported that the U.S. Forest Service made a site visit to the William Floyd Estate and is proposing to cut down every single living pitch pine to stop the beetles, perhaps before the beetles emerge in April. However, she questions whether it might be too late. Since submitting this article she's seen "dozens and dozens of dead and dying pitch pine trees-all infected with southern pine beetle damage" in many other locations along the south shore.]*

*[Ed. Note: As we go to press, Newsday reported on the situation (1/3/15) citing state estimates that 75% of pitch pines in Connetquot State Park have been killed by the pitch pine beetle.]*



## FIELD TRIPS

### **MARCH 7, 2015 (SATURDAY) 10 AM**

*Blydenburgh County Park, Smithtown, NY*

Trip leaders: Andrew Greller, James Lendemer, and Eric Morgan

Email: [agreller2@optonline.net](mailto:agreller2@optonline.net) Phone 516-364-9377

This walk will stress mosses and lichens. Blydenburgh County Park is a 627-acre park run for the residents of Suffolk County. The park is mostly woodland with swamps and fields, and is home to Stump Pond, which is [said to be] second in size on Long Island only to Lake Ronkonkoma. The pond is long and irregularly shaped, somewhat like a boot with a pointed toe. A number of trails and dirt roads make for easy walking; you'll also encounter horseback riders. Please dress for the weather, wear boots for wet walking, and bring a hand lens. Bring lunch and a beverage.

**Directions:** Please contact Andy for directions and meeting location prior to the walk.

### **MARCH 21, 2015 (SATURDAY) 10 AM**

*Dorothy P. Flint 4-H Camp, Baiting Hollow, Riverhead Township, NY*

Trip leader: MaryLaura Lamont

Phone: 631-722-5542

Please join MaryLaura on a late winter botany walk. This botany walk will emphasize tree identification. The 140+ acre site

is on Long Island Sound, and offers a rambling hilly habitat of mature coastal forest atop high cliffs and ridges. Nearby is a pitch pine duneland perched atop the glacial moraine. Steep ravines race down to the Sound beach amid huge boulders left strewn about since the meltwater days of ancient glaciers. This area is beautiful and offers wonderful panoramas of the Sound.

**Directions:** Take the LIE to Exit 71 (Hampton Bays/Calverton). Turn left at bottom of exit ramp, cross the railroad tracks through light at Route 25 and continue north until you reach traffic light at Sound Avenue (approximately 3.9 miles from LIE to Sound Avenue). At traffic light turn right and continue east for 2.5 miles until you see the 4-H Camp sign at the West Entrance on the left side of the road. Turn left at the sign entering the camp at the West side gate of the facility. Drive down the dirt road and park in the parking lot near the buildings. Please contact MaryLaura for further details.

## **SOME UPCOMING FIELD TRIPS**

### **Details to Be Published in April**

Saturday, May 16 --Spring Ephemerals in Shu Swamp

Saturday, June 20 --Froelich Farms, Huntington, Novel Ecosystems

Saturday, Aug. 1 --North Fork Preserves, starting in Moore's Woods

Saturday, August 15 --Alley Pond Park, Queens

## UPCOMING PROGRAMS

### January and February: No meeting!

#### **March 10, 2015\*                      Tuesday, 7:30 PM**

#### **Andy Greller: "An Ecologist Visits New Caledonia."**

This talk will cover the unusual serpentine flora and vegetation of New Caledonia. There are many endemics, including Araucarias, cycads, ferns, and other ancient groups. Andy is the LIBS Vice President, Co-chair of the Local Flora Committee, and is a Past President of the Torrey Botanical Society. He taught biology at Queens College for 30 years, and is a true world traveler.

Location: Bill Paterson Nature Center,  
Muttontown Preserve, East Norwich

#### **April 14, 2015\*                      Tuesday, 7:30 PM**

**Maria Brown and Shreeya Panigrahi: "Bat Pollination Studies in Costa Rica." (MB) and "Multivariate Analysis of Soil pH, Forest Structure, and Human Disturbance in the Glacial Outwash Plain, Long Island, New York." (SP)** There will be a

short presentation on Maria's ongoing studies of pollination by bats in Costa Rica. Shreeya performed a study on the outwash plain at Sans Souci County Park in Sayville, to follow studies by Wherry (1923) and Greller et al (1990), regarding potential decreasing plant diversity resulting from increased soil acidity. Factors considered included the relationship between canopy type (open vs. closed) and tree type (coniferous vs. deciduous) on soil pH, impacts of understory density, and effects of leaf litter type (coniferous vs. deciduous). Maria Brown was a Professional Wetland Scientist for 12 years, and has taught at Sayville High School for the past 16 years. Shreeya Panigrahi is a senior at Sayville High School and will be graduating as the valedictorian of her class in June, 2015.

Location: Earth and Space Sciences Building,  
Gil Hanson Room (Room 123),  
Stony Brook University, Stony Brook

\* Refreshments and informal talk begin at 7:30 p.m.

Formal meeting starts at 8:00 p.m.

Directions to Muttontown or Stony Brook: 516-354-6506